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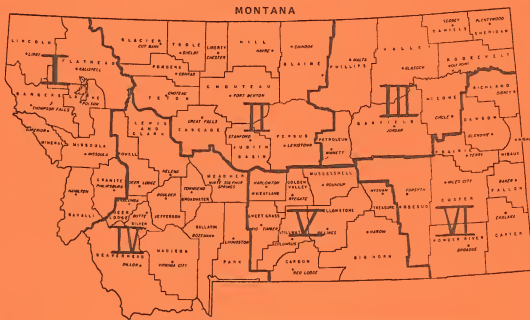
NEWSLETTER

Montana Science Teachers Association

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"Dedicated to quality science education"

September 1987



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Remembering Bob Makela: Teacher, Friend, "Dinosaur Man"

by Doris Simonis

Science educators mourn the loss of one of Montana's most dynamic teachers, Bob Makela of Blue Sky High School in Rudyard. Makela, 47, was killed when his truck left State Highway 213 north of Cut Bank, rolled, and caught fire on July 4, 1987.

A charter member of M.S.T.A. and secretary for the organization since its inception, Bob taught science in Rudyard for 17 years where he was known as an innovative teacher fond of field work. He took students to the Washington coast, to productive fossil sites in Montana, and to the Bob Marshall Wilderness in alternating years. He was also a guest lecturer on paleontology at colleges and high schools across Montana, and he provided lesson packets on dinosaurs to fellow teachers who were interested in developing activities related to geological history. His talks over the last five years were so interesting to young people that Bob received 6,000 letters from students in response.

Makela was an acknowledged expert in paleontology and worked summers at fossil sites in Montana for the Museum of the Rockies. Mick Hager, the museum director, told the Great Falls Tribune, "Bob was a real cohesive force in the research field. He was a camp daddy to everybody. He was a complete teacher. He made everyone who came to camp, from kids to adults, feel welcome and a part of the research effort."

In 1979, Makela and former University of Montana classmate, Jack Horner, discovered a bed of duckbill dinosaur eggs near Choteau on a hill now called "Egg Mountain." They found adult and baby duckbill fossils and four different types of eggs at the site, and developed revolutionary ideas of some dinosaurs as herd animals who cared for their young. Their work has been featured in scientific journals across the world and has recently been acknowledged in such national publications as *Science News*, *National Wildlife*, and *Discover*.

"Mr. Makela," as his students called him, was vigorously intelligent, generous and hard-working. As Superintendent James Smith at Big Sky High recalls, "Whether it be digging bones in hot weather or helping with a building project, he always had time for a friend. His hard work carried into his classroom duties as well. Few compromises were made in his expectations for student work. His love for science and nature was unending and passed on to his students through practical field work as time permitted. As he piloted these outings, guiding students through the love of nature, his love for teaching continually grew."

Bob Makela is deeply missed by his students, colleagues, family and friends. We have benefited by his ideas, enthusiasm and contributions to science education and to Montana teachers. His inspiring example of undiminished eagerness to learn more and to share it by teaching is a legacy to all of us. Thanks, teacher Makela. Thanks, friend Bob.

Fifty Teachers Start B.E.S.T. Project at 1987 Summer Institute in Billings

Fifty elementary teachers with microcomputers lent by their school districts converged on the Eastern Montana College campus July 14-August 4, 1987, for the first NSF-sponsored Better Elementary Science Teaching Institute. These charter members of BEST are representative of the many Montana teachers dispersed across the state. They came; they learned about science, technology and computer networking; and they went back home determined to teach more science in their classrooms and to keep the BEST electronic bulletin board working toward that goal.

M.S.T.A. is pleased to acknowledge the dedication, enthusiasm and accomplishments of its newest members. President Kristy Bick awarded "charter status" in BEST and membership in MST.A. to Cindy Becker, Bozeman, Melinda Berkram, Wibaux, John Cannon and Karen Johnson, Great Falls; Susan Clendenin, Tom Dyson, Sharon Harris, Judy Henry, Debbie Richau, Linda Robinson, Elaine Shong, and Beverly Silkwood, Billings; Frances Cumming, Helena; Kathy Davis, Seeley Lake; Larry Fink, Hysham; Linda Halvorson, Scobey; Barbara Han, Inverness; Brenda Hansen, Baker; Dennis Hanson and Lydia Hanson, Musselshell; Larry Highland, Charlo; James Harkans, Froid, Jan Houghton, Columbus; Shelley Knight, Hamilton; Kim Lapp, Terry; Angela Lappin and Debbie McGrath, Laurel; Linda Layman and Jackie Rochlitz, Glendive; Mike McGuire, Fort Shaw; Catherine Meyer, Ronan; Robert Olsen, Dagmar; Diane Peterson, Harlem; Sharon Petrik, Corwin Springs; Andra Pretty On Top, Lodge Grass; Elaine Rosman and Carole White, Havre; Bonnie Roth, Hamilton; Mary Ann Safford, Columbus; Shari Sandman, Olney; Al Sipes, Broadview; Robert Soper, Malta; Roberta Stoken, Eureka; Millie Thompson, Sheridan; Doris Tolleison, Hinsdale; Debbie Voyles, Wyola; Darlene Watkins, St. Ignace; Jerry Williamson, Busby; Julie Witt, White Sulphur Springs; and Willie Woods, Miles City.

One of the many creative teachers in the BEST group is Brenda Hansen of Baker, Montana. She composed an "Ode to BEST" that described some of the group's experiences this summer. The following is an excerpt from her testimony:

ODE TO BEST

One afternoon in early July

50 strangers descended: optimism high.

Computers emerged from car trunks in parts;

they really did need some push and pull carts.

The ladies were housed on the second and third,

they climbed the stairs muttering many a word.

The men with their brawn bunked on floor #1.

Why weren't the stairs part of their fun?

Each day began with a trek to the SUB,

Saga food kept us sated with a variety of grub.

The time came to learn and see what we knew.

After many a pretest, our frustrations grew.

Astronomy, physics, chemistry and rocks,

were only a few of the mind boggling talks.

Does the earth move?

We once thought it did.

Is sex necessary? That's what he said.

There are 5 kingdoms—we know that as fact.

We saw a microscope's view of how chloroplasts act.

Is that bird a robin, or sparrow or lark?

And do 2 positive ions create a spark?

We learned a great deal—indeed that is so.

We banked it with info we already know.

Goliath was King of Apsaruk Hall;

BBS competency was required by all.

Modem, parameter, file name and such,

are words we must know to keep in touch.

It's the middle of August and all things must end.

We're leaving this place with many a friend

Our horizons have broadened, our minds have been challenged

We're the first of the B.E.S.T.

And our quest is unending.

This dynamic group of elementary school teachers will meet again at the MSTA/MEA/SSMA, etc., Conference in Billings in October. They also anticipate a reunion in June in Missoula when they will welcome an additional "new" BEST group of 50 teachers for a similar institute at the University of Montana. Teachers K-6 who are interested in B.E.S.T. can get more information this fall at the October conference or by writing Dr. Doris Simonis, BEST Institute, School of Education, University of Montana, Missoula, MT 59812.



Oh! How can you forget! This MSTA newsletter is a quarterly publication providing news and ideas for teachers of science. Its success depends on those who share their plans, projects, and

ideas. Send your items for the December newsletter to Editor, Doris Simonis, School of Education, University of Montana, Missoula, MT 59812 by November 1, 1987.

*** Coming Attraction ***

This is the big one. Four state teacher organizations, including MSTA, and the National School Science and Math Association will convene in Billings, October 14-17, 1987. Headquarters is the Billings Plaza Holiday Inn, (406) 248-7701. Your MSTA registration will allow you to attend any organization's sessions. For further information contact Linda Robinson, 656-1871 (evenings), or Jerry Jinks, 657-2392/2315 (days).

Montana Teachers Return From Chemistry Institute

Maureen Driscoll of Troy High School, Richard A. Lewis of Geraldine High School and Douglas Shenkle of Helena High School were among 31 teachers from throughout the greater Pacific Northwest region selected to participate in July in the Summer 1987 University of Washington Institute for High School Chemistry Teachers. Attendees represented the states of Alaska, Idaho, Montana, Oregon, Washington and Wyoming.

The intensive four-week Institute was sponsored by a National Science Foundation grant and the University's Department of Chemistry under the direction of Assoc. Professor Darrell J. Woodman. Institute activities featured lectures on the chemistry of metals by Professor Norman J. Rose, demonstration experiments, sharing of curricular materials by the participants, workshops on teaching, and laboratory, computer and library work. Guest speakers covered contemporary themes including the ozone layer, superconductivity, medical imaging of body chemistry, the role of phytoplankton in cloud formation, and human exposure to toxicants.

1987 "Outstanding Biology Teacher" Roscoe Montgomery Honored by NABT

The selection committee for Montana's Outstanding Biology Teacher Award Program has selected Roscoe G. Montgomery, biology teacher at Bozeman Senior High School as this year's Outstanding Biology Teacher Award recipient.

The annual award program, conducted by the National Association of Biology Teachers, is intended to identify and reward excellence in biology teaching by selecting an Outstanding Biology Teacher in each of the 50 states. The program is sponsored by the publishing company Silver Burdett and Ginn, which presents each award winner with a "World Class" pair of binoculars. In addition, winners also receive certificates and public recognition. All recipients will be invited to a special luncheon to honor awardees, held in conjunction with the National Association of Biology Teachers' National Convention in Cincinnati, Ohio, in October, 1987.

All the nominees for this year's award were highly qualified, according to Craig Kuchel, State OBTA Director. Mr. Montgomery's selection as the award recipient indicates his valuable contributions both to the education profession and to his students.

National Bison Range Offers Ecology Workshop October 24

The annual fall education workshop for Montana teachers will be held at the National Bison Range on Saturday, October 24, 1987. The purposes of the workshop are: (1) to introduce teachers to ideas for using the outdoors as a classroom; (2) to introduce teachers to persons currently involved in outdoor education programs and willing to share skills and materials that have been successful with their students; (3) to demonstrate advantages of The Bison Range and The Pablo and Ninepipe Wildlife Refuges as sites for outdoor classes; (4) to familiarize teachers with resources and materials available for environmental education.

As usual, the program will have a variety of seminars and activities related to local ecology, some of them offered for the first time. Participants may select those most appropriate for their teaching areas.

Registration forms and more detailed information are available from Marcy Bishop, National Bison Range, Moiese, Montana 59824 (phone: 644-2211) or Micheal Malouf, Continuing Education, University of Montana, Missoula, MT 59812 (phone: 243-2900).



Wallcharts featuring handpainted land, sea and air creatures from all over the world—including one illustrating 33 species of whales—are available now for American classrooms from Scandinavian Fishing Yearbook, a Danish research firm.

The charts, which measure 27 inches by 39 inches, show accurate biological specimens labeled in English and Latin on plastic-coated art paper. Each costs \$12.50 including postage and handling.

For a free catalog of the 20 wallcharts available, write: Lars Chr. Storaekre, Viking Trade Corp., 34 Library Lane, Bayville, NY 11709, or phone 516-628-1242.

A Great American Chocolate Story, a 20-minute film or video from Hershey Foods, takes kids on a behind-the-scenes look at the world of chocolate making. It views cocoa and sugar farms in Central America, almond groves in California, peanut farms in Georgia, dairy farms in central Pennsylvania and the chocolate factory in Hershey, PA.

A Great American Chocolate Story is available on free loan in either VHS video format or 16mm film. To schedule, request number 18368 and state the preferred viewing date. Write: Film Scheduling Department, Modern Talking Picture Service, 5000 Park St. N., St. Petersburg, FL 33709.

Teaching Aids for Scientific Topics: Free catalog is available from Christopher Lee Publications, P.O. Box 6202, South Bend, IN 46660.

Three course guides for teaching model rocketry or for using model rocketry in a science class are: *Model Rocketry in the Elementary School*, written by Dr. Herbert Simmons of Western Kentucky University, *Model Rocketry in the High School/Junior High School (Grades 6-9)*, by Dr. Gary Downs of Iowa State University, and *Model Rocketry in the High School (Grades 9-12)*, by Roger Grossenbacher, M.S., Lancaster (OH) High School and director of Peters Planetarium—all experts on the topic.

If you would like a free copy of these guides, please send a large (at least 9" x 12") self-addressed envelope to Course Guides, Estes Industries, 1295 H Street, Penrose, CO 81240, with postage affixed. Apply 58 cents for one course guide, 94 cents for two or \$1.12 or all three. Put a capital E for the elementary course guide, a capital M (middle school) or a capital H (high school) in the lower left corner of the front of the envelope to indicate which course guide(s) you want.

The Astronomical Society of the Pacific and the American Astronomical Society (the two main bodies of professional astronomers in the U.S.) are offering a free national newsletter, *The Universe In the Classroom*, to assist teachers and school librarians in grades 3-12 in including more astronomy in their classroom work.

Each quarterly issue includes short, non-technical articles on new developments in our exploration of the universe; practical classroom activities for teaching astronomy; specific suggestions for the best written and audiovisual resources on astronomical topics.

Articles focus on a variety of interesting subjects in astronomy, including the exploration of the planets, comets and Comet Halley, the search for life elsewhere, the Big Bang, the difference between astronomy and astrology, and much more.

To be put on the mailing list for future issues, teachers or school librarians should write on school stationery and identify the grade level they teach. Write to: Astronomical Society of the Pacific, Teacher's Newsletter Dept. N, 1290 24th Ave., San Francisco, CA 94122.

Montanans Win Top Prizes at Science Symposium

The top high school science students from five states were in Salt Lake City—132 of them—to present papers and compete in the 25th annual Intermountain Junior Science and Humanities Symposium.

The winner was Simone P. Taubenberg of Capital High School in Helena. She studied the role of mast cells on tumor angiogenesis and metastasis in mice and represented the region in the national symposium in May, at the West Point Military Academy.

The symposium is sponsored by the Army, Dugway Proving Ground, the Academy of Applied Science and the University of Utah.

Seventeen Utahns were entered in last year's symposium, but none won. Four of the five winners were from Montana. Normally, the winners pretty much are divided among Utah, Idaho, Colorado, Montana and Nevada, said John W. Boswell, director of high school and prospective student services for the U.

Taubenberg received her award, which was accompanied by a \$200 scholarship, during a dinner at the Little America as part of the closing ceremonies. She and the four others traveled to West Point in May, but she was the only presenter there. The winner of the national symposium went on to an international symposium in London last summer.

Taubenberg's teacher, Thomas A. Pedersen, received a \$300 grant from the Army to buy laboratory materials.

The other Montana winners were Kristin Lavery, 17, from Sentinel High School, Missoula; Robert "Ernie" Lee, 17, from North Toole County High School, Sunburst; and Kathryn Wyard, 17, of Helena High in Helena.

Kristin's paper dealt with a chemical phenomenon called "Leisegang Rings," which form when a chemical salt is combined with a gel containing another salt. She found that different wavelengths of light affect the type of rings that form. The study poses "significant questions for further research," according to the paper abstract.

Lee's paper was titled "A Comparative Study of Invertebrate Blood," describing research on crayfish blood. He compared the clotting mechanisms of crayfish and humans. He also identified and named three types of crayfish blood cells—one type possibly involved in clotting, one that may help form the crusty crayfish shell, and a third that engulfs foreign materials.

Wyard's paper was about research on the ecological impact of poison blue-green algae in Canyon Ferry Reservoir. She took water samples from 1984 through 1986 and found that as blue-green algae became more prevalent, other planktons declined.

An unusual feature of this year's symposium was that four of the five students selected presented papers in biology. The fifth was in physics. There were no winners in chemistry. Boswell said the papers this year were of the highest quality ever and the judges had a difficult time. Research scientists from Dugway and U. faculty members judged.

Every August, invitations to prepare papers for the symposium go out to high schools. Applications must be submitted by November 15 and papers by January 15.

State BBS

The Office of Public Instruction has a new bulletin board system that is open to educators at all levels. It has the capacity of running several message boards at a time. Two of them have been to science, #2 which is called science-net, and #3 which is called BEST Project. The science-net board is for all science teachers to exchange messages and receive bulletins pertinent to science education. The BEST Project is a board for the 50 new science advocates that were trained at EMC this summer. You are welcome to browse this board but we would appreciate it if you would use the science-net board for message exchange unless you are a BEST advocate. Board #1 is a public board for exchanging information between the various disciplines. Other boards will be established as needed.

This board is open to serious educators and you must be sponsored to gain user access. For information about access, please contact Bob Briggs, Science Specialist, Office of Public Instruction, State Capitol, Helena, MT 59620 (444-4439).

The National PSI-Net Board

A National Computer Conferencing Network for Science Education-PSI-Net (short for People Sharing Information) is a National Science Foundation-sponsored cooperative project among government, education and the private sector (IBM Corporation), designed to improve the direct communications among science and mathematics educators and students throughout this nation. The purpose of this project is to expand a "personal computer-based" network currently in existence among the 50 state science supervisors, through a series of downlink, intrastate nodes, into a complete, dedicated conferencing network for science and mathematics educators all over the U.S. and beyond. Critical agencies and, eventually, perhaps commercial vendors will be linked into the system in order to provide time-critical information to participants, as well as coordinate science education studies (both among educators and students). Due to recent advances in PC technology, it is now possible to accomplish these tasks in a cost and time effective manner unprecedented until now.

Montana is an active member of the network and has been for the past six months. This network will be used as a source of information to feed the state bulletin board. Bob Briggs at OPI is the state contact.

★★★★ Presidential Awards ★★★★★

NSTA has announced the Montana winners of the Presidential Award for Excellence in the teaching of science.

Gil Alexander, science instructor at Helena High School, Michael Funk, a science teacher at Libby High School, and Glen Govertsen, a science teacher at Sentinel High School in Missoula will represent Montana in the national science competition. The winner of the national competition will be announced this month.

The Presidential Awards program was started in 1983 to identify middle/junior and senior high school teachers in science and mathematics who can serve as models for the teaching profession. Awardees are judged on their ability to improve students' understanding of science or mathematics, their foundation in a specific area, continued interest and growth in their field of study, involvement in the professional areas of teaching, and for maintaining standards of excellence in the classroom.

Eligible teachers have spent at least five years teaching in the sciences or mathematics in a public or private middle/junior or high school. Nominations are made by students, parents of students, administrators, colleagues and interested others.

Benefits for the national winner will include an expense-paid trip to Washington, D.C., an awards ceremony and presidential citation, honors workshops at the National Academy of Science, a \$5000 award to the teacher's school to be spent under the teacher's direction and other donated gifts.

The two state winners will receive a Citation of Merit and will be honored at a special function at the MSTA Conference, October 15-16, 1987, in Billings.

The NSF administers the PAESMT program through a consortium of professional organizations in science and mathematics comprised of the American Association of Physics Teachers, American Chemical Society, Council of State Science Supervisors, National Association of Biology Teachers, National Association of Geology Teachers, and National Council of Teachers of Mathematics. Important support is also provided by the National Academy of Sciences. The program is managed by the National Science Teachers Association (NSTA) under the direction of Dr. John M. Fowler, the program's Project Director and NSTA's Director of Special Projects.

Montana Natural Resource Camp

Under the carefully shaped canopy of Lubrecht Experimental Forest at Greenough, 34 young people recently learned how to measure trees for lumber, identify edible plants, examine owl pellets and find their way out of the woods without a compass.

And, that's just a sampling of the courses, covering everything from recreation to timber management, taught at the first-ever Montana Natural Resources Youth Camp.

Camp philosophy is to help give young adults, ages 13 through 17, the tools they need to make decisions about management and protection of our natural resources, according to Steve Laursen, forestry specialist with the Montana Cooperative Extension Service which organized the camp.

A subtle theme of the camp is that decisions about timber management and wildlife protection should be based on facts, not emotions.

And, the facts at this camp came not just from government agencies but also from industry and conservation groups. Stone Container Corporation, Champion International, Montana Society of American Foresters, CENEX, Incorporated, and the University of Montana School of Forestry joined hands with groups like the Rocky Mountain Elk Foundation, Montana Department of Fish, Wildlife and Parks, Montana East Side Forest Practices Committee and the Keep Montana Green Foundation.

With support from a variety of sources the camp was bound to be a success, according to Laursen. Young people felt they weren't being coerced into accepting one management philosophy over another.

Jesse Anders, camper from Missoula, agreed. "They didn't shove anything on us," he said, adding that "they had a way of teaching us—making us learn—that wasn't like school."

Richard Reid, a private forester from Missoula who taught classes at the camp, felt that camp instructors complemented each other. "I didn't sense any real hidden agenda by any one resource group to impose values on the kids," he observed. "We are all resource professionals...the kids are going out of here with an appreciation of the true complexity of managing natural resource systems."

Adults frequently butt heads in Montana over timber and wildlife management, and managers at the Cooperative Extension Service have been aware of the conflicts for years. Last January, Laursen, accompanied by Mike Cavey, Extension 4-H specialist, began organizing the Lubrecht camp. Earlier this summer, they attended the Inland Empire Natural Resources Camp in Idaho—which has been a success for 25 years. Mikki Kison, a conservation district manager from Washington, has been involved with the Inland Camp and helped Laursen and Cavey at Greenough.

"This camp has been a phenomenal success," Kison said. "Even if we just create an awareness of natural resources in our everyday life—that's a success story."

1988 Awards Programs National Science Teachers Association

This could be an opportunity for you to describe what you are doing for the benefit of others and the chance for personal and school recognition. You and every science teacher are encouraged to accept this invitation as a personal one. Let us all hear about your innovative ideas, let us consider you for recognition in our 1988 program. We can all learn and grow from such sharing. Also, the process of communicating your ideas can help with this further development. Exchange of ideas is important for any profession.

All members of the science teaching community are eligible to enter.

Major cash awards are offered in most of the programs; several programs also offer expense-paid trips to the NSTA national convention and one-year complimentary memberships in NSTA.

The deadline for submission of entries is December 1, 1987.

Gustav Ohaus Program for Innovations in Elementary and Secondary Science Teaching. Sponsor: Ohaus Scale Corporation
Gustav Ohaus Program for Innovations in College Science Teaching. Sponsor: Ohaus Scale Corporation

CIBA-GEIGY Exemplary Middle/Junior High and High School Science Teaching. Sponsor: CIBA-GEIGY Corporation

CIBA-GEIGY Exemplary Elementary Science Teaching. Sponsor: CIBA-GEIGY Corporation (Presented by the Council for Elementary Science International, a Division Affiliate of NSTA)

Distinguished Service to Science Education. Sponsor: National Science Teachers Association

Distinguished Teaching Award. Sponsor: National Science Teachers Association

Science Screen Report. Sponsor: Science Screen Report, Incorporated

The Robert H. Carleton Award for National Leadership in the Field of Science Education. Sponsor: National Science Teachers Association

Sheldon Exemplary Equipment and Facilities. Sponsor: Sheldon Laboratory Systems, Division of General Equipment Manufacturers

Outstanding Elementary Science and Technology Award. Sponsor: Science Weekly, Incorporated

STAR (Science Teaching Achievement Recognition) Awards. Sponsor: American Gas Association

Student Programs. Watch your journals for further details and deadlines.

Thomas Edison/Max McGraw 8th Annual Scholarship Program. Sponsor: The Thomas Edison Foundation—The Max McGraw Foundation

The Duracell Scholarship Competition. Sponsor: Duracell Inc.

Essay Awards Program. Sponsor: Du Pont Company and Biology Bulletin Monthly

Space Science Student Involvement Program for Secondary Schools. Sponsor: National Aeronautics and Space Administration

For further information regarding any of these awards contact NSTA Awards Programs, National Science Teachers Association, 1742 Connecticut Avenue, N.W., Washington, D.C. 20009.

MTSA NEWS

Montana Section of AAPT

The Montana Section of AAPT will hold its annual fall meeting in conjunction with MTSA in Billings on October 15-16. This year MSAAPT will sponsor two versions of a workshop. The workshop is based on work by the Iowa Physics Project which has developed a Physics Resources and Instructional Strategies for Motivating Students (PRISMS) teacher's guide. This guide contains 125 high-interest activities based on popular objects such as hot wheels and skateboards. (See elsewhere in this newsletter for details and an application blank.) The workshop on Thursday will have activities appropriate for physics teachers, while on Friday the activities will be designed for physical science teachers. Each participant will receive a copy of the complete teacher's guide.

The program for Friday contains invited talks on some of the currently active areas in physics during the morning session with contributed papers in the afternoon. A reception and banquet are planned for Thursday evening.

Planetarium Director Hired

Robert Hoyle has been hired as the Director of the Taylor Planetarium in the Museum of the Rockies. Bob comes from the Morehead Planetarium at the University of North Carolina in Chapel Hill where he has planned and developed programs for a wide range of audiences. In particular, he has worked with public school groups in the planetarium as well as school settings. Earlier in his career, he served as an observing astronomer, worked in the digital mapping of terrain and data enhancement, and taught physics.

Another aspect of Bob's life takes place in the Northern Rockies. He has served as a seasonal Park Ranger in the Grand Teton National Park for 13 years where he developed a sky interpretation program. A particular interest is in Native American sky interpretation. He has also taught courses at the Teton Science School and the Yellowstone Institute.

Bob will join the Museum staff at the beginning of October to work on finalizing plans for the interior of the planetarium and the auxiliary equipment and to begin work designing and developing programs. The shell for the planetarium should be completed sometime next spring. The Digistar projection system should be ready in late spring. If everything goes well (does it ever?), the planetarium could open for limited use a year from now. It will be dedicated in 1989 in celebration of Montana's centennial.

MSU Hires New Science Educator

Elisabeth Charron has been hired as a science educator in the Department of Education in MSU's reorganized College of Education, Health and Human Development. Elisabeth recently received her Ph.D. from the University of Georgia with a specialization in life science and environmental education. She has a wide range of experience in science education including evaluation of environmental education courses and the Chautauqua programs for secondary science teachers, the training of evaluators, supervision of student teachers, curriculum development, and presentation of workshops and professional papers. In her "spare" time she has studied the Japanese educational system. She also has had a variety of very interesting jobs including Environmental Education

Specialist at Everglades National Park, science teacher in Anchorage and Healy, Alaska, and Outdoor Education Coordinator at the Arboretum and UC-Davis as well as summer jobs at Grand Teton, Denali, Yosemite, and Mt. Ranier National Parks and the Chugach and Tongass National Forests.

Montana Summer Science Institute Lesson Plans Available

Gil and Marilyn Alexander's Summer Institute has resulted in over 50 excellent lesson plans for various grade levels in the area of science. These look excellent. They have been published in a book that is almost 200 pages long, excellently put together and organized for use in classrooms. This book was designed primarily just to give to participants in the workshop, but I am sure that Gil and Marilyn would consider making them available to MSTA members. Send requests to Gil at Helena High School, Helena, Montana or to Marilyn at Capital High School in Helena, Montana.

National Chemistry Day

November 6, 1987, has been designated National Chemistry Day. The purpose of this auspicious event is to communicate to the public the benefits and importance of chemistry as a pervasive and ubiquitous factor in our everyday lives. The Montana section of the American Chemical Society is most interested in reaching students (and their teachers) in grades 1-12 in an effort to broaden their awareness of the chemicals and chemical by-products that impact their existence. We hope that you will use this occasion as an effective educational tool and as a valuable opportunity to learn more about chemistry.

It is your decision whether or not you wish to participate in what should prove to be an important national event. If you are interested in joining in the celebration I have included several suggestions which might be useful.

1) A coloring contest of a poster which we will provide that showcases some of the useful "chemicals" that we take for granted.

2) A contest to see who can name the most products in the classroom, home, etc., that are related to chemistry. You might be surprised by the wide range of answers!

3) A Chemistry "Magic Show" that could be performed by you or by a local college professor or student.

4) A poster contest designed to highlight a variety of important or unusual contributions of the chemical industry.

5) A logo contest to see who can create the most original slogan promoting chemistry. Two examples are: "Better Living Through Chemistry" and "Chemists Have Solutions."

6) An essay contest dealing with "Chemical Addiction: A Positive Approach," indicating that we all have chemical "habits" such as nylon, vitamins, makeup, plastics, etc.

7) Invite a local chemist from one of the colleges or industries in your area to talk to your students about their research, potential careers in chemistry, etc.

These are just a few possibilities which can be adapted to a variety of ages.

You are far more aware of the resources in your area than anyone else. You are, therefore, in a much better position to determine just how involved you would like to be with National Chemistry Day. Call the other teachers in your school or in neighboring schools. Collaborative efforts are always more fun. Challenge "rival" classes in any of the proposed contests. See if you can help spread interest. The ultimate decision to get involved

is yours. The ACS is here as a resource to help you in any way we can with more ideas, suggestions, guest magicians, technical assistance, and moral support.

Make the decision to get involved. Only if you choose to participate can we help you help us celebrate National Chemistry Day. It's a great opportunity for everyone to learn something new. Please contact Andrea Sterle, Chemistry Department, Montana Tech, Butte, MT 59701, if you have any questions or suggestions. Join the celebration.

PRISMS

MSAAPT and the Office of Public Instruction are jointly sponsoring workshops for physical science teachers and physics teachers at the October 15-16, 1987, inservice workdays in Billings. The all-day workshop presented on Thursday will be designed for 24 physics teachers while the Friday work-workshop will be designed for 24 physical science teachers.

Each workshop is based on the Iowa Physics Project which has developed a Physics Resources and Instructional Strategies for Motivating Students (PRISMS) teacher's guide. The activities have been developed in the learning cycle which includes exploration, concept development, and application. Experiences dealing with hot wheels, dart guns, skate boards, model sailboats, bicycles, etc., are the basis for these high-interest activities. Twelve representative activities (of more than 150 listed in the notebook) will be presented. Each participant will receive a copy of the complete set of PRISMS activities (a \$45 value).

The workshops will be directed by Dr. Roy Unruh, Physics Department, University of Northern Iowa, primary developer of the PRISMS materials. Dr. Unruh comes highly recommended and all participants will certainly benefit from their participation.

For further information, fill out and forward the form below to: Dr. Lindsay Hess, Physics Department, Montana Tech, Butte, MT 59701.

Name _____

Phone No. _____

Mailing Address _____

Current teaching assignment _____

I am interested in receiving college credit: ☐ Yes ☐ No

INTERMOUNTAIN JUNIOR SCIENCE AND HUMANITIES SYMPOSIUM

Research Paper Application Form

Student's Name _____
Last First

Address _____
Number and Street City State Zip

School _____ Year in School _____ G.P.A. _____

School Address _____
Number and Street City State Zip

Title of Paper _____

Teacher's Signature _____

Student's Signature _____

This form must be attached to student research paper, signed by the teacher and student and submitted by the November 15 deadline. Send to Bob Briggs, Science Specialist, Office of Public Instruction, Helena, MT 59620.

(Do Not Write Below. For Official Use Only)

Selection Committee Evaluation

Value from 1 (low) to 10 (high)

1. Project originality _____
2. Literature review _____
3. Scientific approach _____
4. Experimentation _____
5. Data and/or results _____
6. Conclusions _____
7. Visuals, graphs, etc. _____
8. Clarity and completeness _____
9. English usage _____
10. Presentation, neatness _____

Total

Intermountain Junior Science and Humanities Symposium

The 26th Intermountain Junior Science and Humanities Symposium will be held on the University of Utah Campus, February 24-27, 1988. As in the past, we wish to invite your district's participation. Food, lodging and symposium expenses for delegates will be covered by the symposium administration. Travel expenses will be the responsibility of the delegate, school or sponsoring institution.

Additionally, we will be able to accept a limited number of delegates who wish to attend and pay their own expenses. The cost will be \$130.00 for students and \$150.00 for teachers. As was the situation last year, "extra" or "paid" delegate reservations will be accepted on a first-come basis until all available slots are filled.

The symposium is planned with the same format as in previous years. It will be an exciting program, with opportunities for delegates to visit several laboratories on campus and to hear eminent university professors present interesting lectures. Outstanding student researchers will have the privilege of presenting reports of their research efforts in competition for a trip to the National Junior Science and Humanities Symposium.

State science teachers will be notified in early fall with complete criteria for selection of Montana's official delegates. Information will be included for student application.

The criteria for student application will be as follows: a GPA of not less than 3.00; preparation of a research paper on their own individual projects, most of this project to have been completed by November 15; open to grades 10, 11 and 12.

The selection process is: 1) By November 15, science teachers must have sent to the Office of Public Instruction the research papers of all students who wish to compete for official delegate status. The cover sheet for the report should include the student's name, year in school, the name of the high school, the overall GPA, and the title of the research paper. All of the papers are to be as complete as possible. Additional work may be included in the paper that will be submitted to the Symposium by official delegates in January. 2) If a school submits more than one application, a rank order list could be provided by the science teacher to assist in the selection process. 3) A selection committee will review the papers and select the official delegates. The quality of the papers submitted will be the major criterion for selection. 4) Letters will then be sent to all participating schools informing them of the students from their schools selected as official and extra delegates with Symposium forms enclosed. These will need to be returned to Symposium officials by December 1. Should an official delegate decide at the last minute not to submit a paper, the funded official delegate slot will be awarded to an alternate with a paper. 5) Official delegate status for teachers will be awarded to schools having the largest number of official student delegates.

Any questions concerning the selection of Symposium delegates for this year should be directed to Bob Briggs, Science Specialist, Office of Public Instruction, Helena, MT 59620 or call 444-4439.

Watch your mail for more information!!

Please Post,
Duplicate
and Disseminate

Montana Science Symposium Rules

A committee of Montana science teachers assisted in devising the method for selection of participants to the Utah Symposium. Their suggestions are used in the selection of Symposium delegates.

State science teachers are notified in early fall with complete criteria for selection of Montana's 20-24 official delegates. Information is included for student application.

The criteria for student application is as follows:

1. A GPA of not less than 3.00.
2. Preparation of a research paper on their own individual projects, most of this project to have been completed by November 15.
3. Open to grades 10, 11 and 12.

Selection process:

1. By November 15, science teachers must have sent to the Office of Public Instruction the research papers of all students who wish to compete for official delegate status. The cover sheet for the report will consist of the research paper application form which includes the student's name, year in school, the name of the high school, the overall GPA, and the title of the research paper. It is to be understood that all of the papers are to be as complete as possible. Additional work may be included in the paper that will be submitted to the Symposium by official delegates in January. Applications received after November 15th will not be considered in the selection process.
2. If a school submits more than one application, a rank order list must be provided by the science teacher to assist in the selection process.
3. A selection committee will review the papers and select the official delegates. The quality of the papers submitted will be the major criterion for selection. The score for each paper will be determined by following the criteria on the Research Paper Application Form.
4. Letters will then be sent to all participating schools informing them of the students from their schools who were selected as official and extra delegates with Symposium forms enclosed. These will need to be returned to Symposium officials by December 1.

Should an official delegate decide at the last minute not to submit a paper or should additional official delegate positions become available, the funded official delegate slot will be awarded to alternates selected in rank order by the selection committee.

5. Official delegate status for teachers will be awarded to schools having the largest number of official student delegates.

Any questions concerning the selection of Symposium delegates for this year should be directed to Bob Briggs, Science Specialist, Office of Public Instruction, Helena, Montana 59620.

Astronomy

How many words can you make out of the letters in ASTRONOMY without using proper names?

2 letters = 12

am, an, as, at, ay, my, no, on, or, os, ao, to

3 letters = 39

ant, any, arm, art, man, mar, mat, may, moo, mot, nay, nor, not, oar, oat, ort, ram, ran, rat, ray, rom, rot, sat, say, son, sot, soy, sty, tam, tan, tar, tom, ton, too, tor, toy, try, yam, yon

4 letters = 73

ants, arms, army, arts, arty, atom, many, mars, mart, mast, mats, moan, moat, mono, mons, mony, moon, moor, moos, moot, mora, morn, mort, most, myna, naos, nays, norm, nosy, oars, oary, oast, oats, onto, orts, rams, rant, rats, rays, roam, roan, room, rgot, rosy, rota, rots, ryot, snot, soar, soon, soot, sora, sort, stan, star, stay, stoa, tarn, tars, taro, toms, tons, toon, torn, tots, toys, tram, tray, troy, tsar, tyro, yams, yarn

5 letters = 57

arson, atoms, atomy, atony, manor, marts, mason, mayor, mayst, moans, moats, monas, moons, moony, moors, moots, moray, moron, motor, mynas, nasty, nomos, norms, rants, rayon, roars, roast, roman, rooms, roomy, roost, roots, rooty, rotas, ryots, satyr, smart, sooty, snoot, snort, sonar, stomas, story, stray, storm, story, tarns, taros, toons, torso, toyon, trams, trays, trona, tryma, tyros, yarns

6 letters = 17

manors, maroon, matron, mayors, morays, morons, motors, ramson, ranson, ratoon, rayons, romans, snooty, stormy, stroma, toyon, tronas

7 letters = 5

maroons, masonry, matrons, ratoons, transom

Total = 203 words

Please send additions or corrections to Larry Kirkpatrick.

Summer Science Camp Serves Elementary Teachers

Gil and Marilyn Alexander report that the Montana Summer Science Camp once again grew in members and expanded its program during the summer of '87. During this past season, the outdoor field course located at Canyon Ferry Lake was able to offer a 12-day field course to 20 elementary teachers from around the state. The course was sponsored by a grant from the U.S. Department of Education which paid for tuition, instruction, housing and meals. MSTa was able to pay for transportation to and from the site. The course included two-day sessions in topographic mapping, microbiology, meteorology and chemistry, fossil hunting, and an evaluation of science software for elementary classrooms. A day of sapphire mining and field trips through two hydroelectric power plants were also included.

Elementary teachers selected as participants were: Jenna Kay Allie, Billings; Muffie Blyeu, Bozeman; Jann Clouse, Missoula; Darleen Cook, Lolo; Frances Cumming, Helena; Frank Fleming, Fairfield; Jean Howard, Pat Jense, Jenine Johnson, Helena; Charles Karlén, Grass Range; John Maloney, Darby; Debbie McGrath, Laurel; Joyce Nachtsheim, Helena; Ellen Otero, Stevensville; Terrill Schaub, Havre; Don Slabaugh, Whitefish; Sally Tibbs, Missoula; Denny Wilson, Hamilton; Colleen Daly Windell, Bozeman; and Larry Wade, Missoula.

These teachers are available to discuss this program with you and are responsible for inservice programs in their home school districts. Look for the display at the MSTa meeting in October.

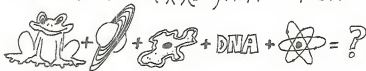
In addition to the elementary teacher session, two sessions of the Summer Science Camp were offered to gifted and talented high school students from across the state. Each session had 16 students, several of which were returning from previous years to do independent studies. Returning students are allowed to earn college credit from the University of Montana through a special pilot project for high school juniors and seniors. A booth showing the students in action will be available at the MSTa meeting in Billings this October.

The following students attended from areas outside Helena: David Alzner, Kalispell; Suzanne Bonifas, Troy; Eric Bieche, Kalispell; Tony DeVoe, Missoula; Gard Gersmel, Winnett; Wade Johnson, Tomball, TX; Justin Marble, Chester; Greg Wolgamot, Great Falls; Brian Bell, Billings; Mitchell Damm, Sidney; Mark Friden, Great Falls; Toni Housel, Sunburst; Stephanie Richardson, Missoula; and Orzila Schwindt, Sunburst.

Helena students from the two Helena schools are listed below: Chris Eckel, Clancy; Greg Garber, Jeff Berry, East Helena; Kim Gilleland, Brian Burnside, Rick Belgard, Renee Doney, Gwen Gray, Erica Henry, Alex Johnson, Steve Maughan, Chris Poulsen, John Poulsen, Peter Rolando, Sara Sartorius, Liesl Strickler, William Taubenberger, and Alleen Whitney all of Helena.

Tentative dates have been set for three sessions to be offered during the summer of '88. The Elementary Teacher's Field Course will most likely be from June 20 through July 1. The high school student camps will be offered July 5 through July 16, and July 18 through July 29.

$$(5)(5^{A^*}) + 10A^* + (2)(5)(5^{A^*}) + 15A^* = 100A^*$$



THE "HUMAN FROG" LAB

Contributed by:
Sharon Edmisten
Kempsville Jr. High
Virginia Beach, VA

- I. A. Write your name 3 times on a piece of notebook paper.
- B. Hold your hand in the container of ice water for one minute and then write your name 3 more times on the same piece of paper.
- C. Warm your hand by massaging or rubbing it. Write your name 3 more times on the same piece of paper.
- D. Compare your handwriting. What effect does temperature have on the way your muscles work? _____

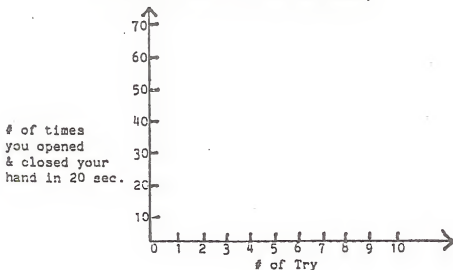
Can you write better when your muscles are warm or cold? _____

- II. A. Open and close your hand quickly as many times as you can in 20 seconds. Have your partner time you and record the results. Repeat this test 9 more times and record your results on the chart. Then place your results on the graph.

CHART

Try #	1	2	3	4	5	6	7	8	9	10
# of times opened & closed hand.										

GRAPH (MAY BE A BAR OR LINE GRAPH)



Muscle fatigue or "tired muscles" are caused by a lack of oxygen in the body. Lactic acid builds up and causes soreness and tiredness in the muscles.

The Maybe Baby

by Sandra Starr
Caholia High School
Caholia, Illinois 62206

The general science or biology student will enjoy this exercise in genetics while at the same time learning how recessive and dominant genes affect traits from generation to generation.

The object of this exercise is for a set of parents to complete a set of Punnett Squares according to their own personal traits. The result of each trait is relayed to a "stork" who in turn draws his/her own rendition of a child according to the information he/she is given. The drawing is not seen by anyone other than the stork and the teacher. When all the drawings have been completed, the teacher tapes them across the blackboard for viewing. The "parents" then try and identify their child.

Direction:

The class is divided into groups of three; one student will be the stork, and two students will act as the parent group (it is not necessary that parents consist of one male and one female. There have been occasions when the correct number of males and females were unavailable, so I had the students number off before I explained the exercise, i.e., 1,2,3. All one's were mothers, all two's fathers and three's storks).

All that is needed are copies of instructions and Punnett Squares for the parents and instructions, crayons, and some type of drawing paper for the stork. (Also, the stork needs a clipboard or hard surface that he/she can draw on without the parents seeing the picture, i.e., a large thin book or blocked off area of the desk).

INSTRUCTIONS FOR PARENTS

Complete each Punnett Square to determine what traits your child may inherit. As you complete each square, tell the stork the results and then begin on the next square until all squares are finished.

To complete each square, each parent must determine his/her dominant and recessive genes from his/her own parents (you get one half of your genes from your mother, one half of your genes from your father). If you do not recall a trait of your parents--guess as best you can.

Sample Punnett Square:

Mother: Your mother has normal vision and your father is farsighted.

Father: Your mother is farsighted and your father has normal vision.

Father's Side of square

	S	s
S	Ss	Ss
s	Ss	ss

Mother's side of square

Farsightedness (dominant-S)
Normal vision (recessive-s)
SS or Ss = farsightedness
ss = normal vision
results 3:1 for farsightedness (phenotype)



INSTRUCTIONS FOR STORK

As genetic information is given to you for each trait from your set of parents, DRAW YOUR VERSION OF WHAT YOU THINK THEIR CHILD WILL LOOK LIKE.

- If the result of the Punnett Square is 4:0, you must use the trait receiving 4.
- If the result is 3:1, use the trait receiving 3 (exception: You may use a trait receiving 1 once if you wish).
- If the result is 2:2, you make the choice of what trait to draw. (Note: in this case, while genotypes differ, phenotypes do not.)

DO NOT LET ANYONE SEE YOUR DRAWING. WHEN YOU HAVE FINISHED, TAKE THE DRAWING TO YOUR TEACHER.

Hair color
 dark (dominant)
 light (recessive)
 BB or Bb = brown/black
 bb = blonde
 results _____

Height
 Tall (dominant)
 Short (recessive)
 TT or Tt = tall
 tt = short
 results _____

Freckles
 Freckles (dominant)
 no freckles (recessive)
 FF or Ff = freckles
 ff = no freckles
 results _____

Ear lobes
 attached (dominant)
 unattached (recessive)
 LL or Ll = attached ear lobes
 ll = free ear lobes
 results _____

Fingers & Toes
 extra fingers/toes (dominant)
 normal number (recessive)
 DD or Dd = extra
 dd = normal number
 results _____

Eye color
 brown (dominant)
 blue (recessive)
 BB or Bb = brown
 bb = blue
 results _____

Lips
 Full lips (dominant)
 Thin lips (recessive)
 TT or Tt = thick
 tt = thin
 results _____

Dimples
 dimples in cheeks (dominant)
 no dimples (recessive)
 DD or Dd = dimples
 dd = no dimples
 results _____

Notes:

This exercise could be modified into groups of seven: Four grandparents, two parents and a student. The procedure is the same except that one set of grandparents stand behind each parent and traits must be identified according to the dominant traits of the grandparents. This allows for any uncertainty of the student's (acting as a parent) own heritage, plus it is an added lesson that visible traits sometimes skip a generation.

The form for the Punnett Square may also be modified for other traits.



Energy Education Mini-Grants for Schools

The Department of Natural Resources and Conservation (DNRC) encourages teachers to develop innovative energy projects for classroom use by taking advantage of its Energy Education Mini-Grant Program, which provides financial assistance for classroom projects.

DNRC will award up to a maximum of \$500 to elementary and secondary teachers undertaking various energy education activities. A total of \$5,000 is available, and the agency expects to fund between 10 and 15 projects for the upcoming school year.

The deadline for submitting proposals is October 31. Grants will be awarded by January 1, 1988, for projects to be completed by June 15, 1988. Those receiving mini-grants will be asked to give a brief final report. DNRC will publicize completed projects and distribute the reports to other Montana schools.

For application information, contact Peggy Nelson, DNRC, 1520 E. 6th Ave., Helena, MT 59620 (444-6697).

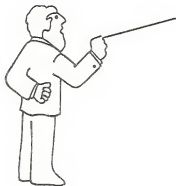
Do You Have a Teacher of the Year?

Since September 30 is the deadline for applications for the 1988 Montana Teacher of the Year, you should be thinking about nominating a teacher for the honor.

The Teacher of the Year is not "the best" teacher in the state; rather she/he is an exemplary and articulate representative of the many outstanding teachers in Montana, a spokesperson and advocate of education, who becomes a candidate for National Teacher of the Year.

Schools, groups, or individuals may make a nomination. Eligible are teachers K-12 who plan to remain in an active teaching status. Nominations should be made without discrimination on the basis of race, sex, religion, national origin, or handicap.

Information and official candidate portfolios are available now. The latter must be used to qualify a nominee. Contact Ed Eschler, OPI, State Capitol, Helena, MT 59620.



MSTA's BEST Grant

MSTA is planning summer institutes over the next three summers for elementary teachers. The first one was at Eastern Montana College in Billings last summer. U of Montana and Montana State are sites for the following summers. The institute is designed to update elementary teachers in physics, chemistry, biology, earth science, and space science. In addition, there will be training on using the OPI computer bulletin board. Elementary teachers interested in next summer's institute should contact Bob Briggs, Office of Public Instruction, State Capitol, Helena, MT 59620 (444-4439).

Bioclocks Project

Seldom is it possible to define the beginning, much less the originator, of a particular branch of science. It can be done in the field of bioclocks. Furthermore, one of the "parents" of bioclocks lives in Bozeman! Dr. Colin Pittendrigh is credited with being one of two or three scientists that began this exciting area of study in the 50's. This fall we heard that he was presenting a 10-lecture series to an MSU honor class. We quickly wrote a grant to do the whole class in the TV studio and tape the series. The raw footage is "in the can," Joan is making transcripts of the tapes, and we're just starting post-production. High school biology teachers watch for more information on this.

MSTA NOMINATIONS

The MSTA nomination committee is seeking good, qualified candidates to run for the Board of Directors of MSTA. This year the committee will select candidates for directors from Regions I, III and V.

As a member of MSTA, would you nominate outstanding members who could serve in one of these positions? Past directors are eligible to be renominated.

Please encourage interested persons to seek a nomination to the MSTA board. MSTA can only keep growing if we can have members serving on the board who are of the high caliber of past members. Thanks for your help.

I hereby nominate _____
for the office of _____
Nominator _____

(See Newsletter cover for the counties encompassed by each regional director.)

Project WILD



HOW CAN PROJECT WILD HELP YOU IN YOUR CLASSROOM?

Few teachers with an interest in wildlife education have time to research existing materials and develop lesson plans emphasizing wildlife. With this in mind, Project WILD designers have researched and developed many activities that can be used without a lot of time and research on the part of the classroom teacher. Each activity includes a statement of the instructional objectives, a brief description of the instructional method employed, background information for the teacher, a list of materials needed, step-by-step procedures, a few limited examples of ways in which to evaluate student learning, an indication of recommended grade level, subjects from which concepts are drawn, skills, duration, a recommended group size, setting (indoors or outdoors) and a key vocabulary. In every case, the teacher is encouraged to adapt activities for different ages, subjects, skills and group sizes. Since each activity is designed to stand alone, there is no need to schedule the activities in order, nor to undertake all the activities developed for a certain grade level.

Project WILD activities can be incorporated into many subject areas — not just those dealing with the life sciences. Some of the subject areas that Project WILD activities can be useful in are: art, drama, geography, government, health, history, home economics, language arts, mathematics, music, social studies and speech. In all cases, Project WILD employs a "hands-on" approach to teach students about their world and the ways in which their actions will determine the future of wildlife, natural resources, the environment and, ultimately, the quality of life on earth.

WHAT'S IN PROJECT WILD'S FUTURE?

With more teachers being introduced to Project WILD's approach to environmental education every year, it is the program's hope that students of all ages will think about the future of this planet. Each of us needs to be concerned about our earthly home, for it is not just our home — we share it with all living things. In truth, the future of all living things depends on the decisions and choices we make now.

One choice each of us can make is to seek out and support quality educational programs. Project WILD is one such program. Emphasizing wildlife as a way to understand our responsibilities to all living things is one way to help not only young people but people of all ages become aware of the fragility of our environment and the need to protect our habitat and the habitat of all things "wild."

WANT MORE INFORMATION?

If you would like to receive more information about Project WILD workshops or how you can attend, write to:

Bob Briggs, Science Specialist
Office of Public Instruction
State Capitol
Helena, MT 59620

or

Vince Yannone
Youth Education Specialist
Department of Fish, Wildlife and Parks
1420 East Sixth Avenue
Helena, MT 59620

Highlights of the Bozeman Meeting of American Association of Physics Teachers

Each summer the AAPT holds its national meeting at a major university. This summer, over 800 physics teachers traveled to MSU, June 15-19, for a week of events ranging from research symposia to informal sharing sessions to typical tourist activities.

The pre-meeting days (Monday and Tuesday) featured many workshops and research tutorials. The 24 workshops were dominated by computer activities, but also featured lecture demonstrations, videotape production, videodiscs, research in physics education, fundamentals of radio, the physics of SDI, and astronomy. The two full days of frontiers-of-physics tutorials sponsored by the Montana State University Physics Department were well attended. Participants learned about cosmology, compact astronomical objects, critical phenomena, ferroelectricity, magnetism and nonlinear optics.

By Wednesday morning the vendors had arranged their books and equipment, and the invited and contributed sessions were actively buzzing with the exchange of ideas. Thursday was the busy day. In early afternoon the Millikan awardee, Don Ivey, was introduced while hanging upside down. From his frame of reference he claimed that past-president Robert Clark (and the entire audience) were really upside down.

The only rain of the week forced the picnic inside, but the old-time Montana fiddle music featuring Hal Amundson, four-time undefeated fiddle champion, continued as planned. Somehow, the high school group managed to sneak between raindrops long enough to hold their yearly Physics Olympics.

The evening ended with the traditional demonstration show. However, as it was scheduled for a gymnasium, a group of Montana physics teachers treated over 900 people to a "physics circus." Large scale versions of some traditional demonstrations were performed under the imaginary big top by costumed actors. The circus ended with a full-scale version of the "monkey-shoot" experiment.

The Friday evening banquet included make-your-own banana splits and some spoon hanging. The featured attraction of the evening was provided by physicist astronaut Loren Acton, who showed slides of the mission he flew as a mission specialist on an early Challenger flight. His humorous and insightful comments and responses to the questions capped a truly memorable week.

**MONTANA
SCIENCE TEACHERS
ASSOCIATION**

Gil Alexander, Treasurer
Helena High School
Helena, MT 59601

Membership Category:

1 year \$8.00 _____

2 years \$15.00 _____

3 years \$28.00 _____

1 yr./Student \$3.00 _____

Retired _____

Return this statement with
your check payable to MSTA
to the above address.

MEMBERSHIP APPLICATION (Please Print)

Name _____
Last First Middle

Address _____

County City State Zip Code

Phone () _____ Date _____

Name of School/Affiliation _____

MSTA Region (see map on cover) _____

Grade Level: Subject:

_____ K-6	_____ Integrated Science	
_____ 6-9	_____ Life Sci	_____ Biol
_____ 9-12	_____ Phy Sci	_____ Chem
_____ Col/Univ	_____ Earth Sci	_____ Phys
_____ Sup/Adv	_____ Other	_____ Mth

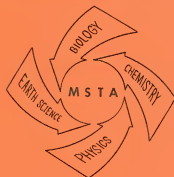
Membership includes one year subscription (4 issues) to *The Montana Science Teacher*

MSTA will help the individual participate in determining the destiny of science education in Montana. The organization serves as a vehicle for educators from all professions to exert positive influences on young people. Many important decisions

concerning the scope and direction of science education will be strongly influenced by our organization.

The MSTA goals are to increase public awareness, interest and support of science education in Montana.

**Montana Science
Teachers Association**



*Dedicated to quality
science education*

Office of Public Instruction
Ed Argenbright, Superintendent
State Capitol, Room 106
Helena, MT 59620